REMARKS/ARGUMENTS

Claims 17-23 and 32-40 are pending in the application. By this Amendment claims 17-23, and 32-40 are amended, and claim 41 is canceled without prejudice or disclaimer. Support for the claims can be found throughout the specification, including the original claims, and the drawings. Withdrawal of the rejections in view of the above amendments and the following remarks is respectfully requested.

I. Informalities

The Office Action objects to claim 41 under 37 CFR 1.75(c). Claim 41 is cancelled, and thus the objection is moot.

II. Rejection Under 35 U.S.C. §112, First Paragraph

The Office Action rejects claims 38-40 under 35 U.S.C. §112, first paragraph as allegedly failing to comply with the written description requirement. The rejection is respectfully traversed.

Claim 38 recites, *inter alia*, wherein the at least one insert is a fabric insert that extends across a node formed in the nodal mould. It is respectfully submitted that claim 38, in its current form, meets the written description requirement. That is, a description of the at least one fabric insert recited in claim 38 is provided in the specification. More specifically, page 10,

lines 4-10, states that "[t]he lengths of reinforcement pass from one frame part 12 to another continuously through the node 13" (see also Figure 6 of the present application). This statement, taken in light of Figure 6, would be well understood by one of ordinary skill in the art to indicate that the lengths of reinforcement pass continuously through the node, but not necessarily that the inserts themselves must pass continuously through the node.

Accordingly, it is respectfully submitted that claim 38, as well as claims 39-40, which depend therefrom, meet the requirements of 35 U.S.C. §112, first paragraph, and thus the rejection should be withdrawn.

III. Rejection(s) Under 35 U.S.C. §103(a)

The Office Action rejects claims 17-19 under 35 U.S.C. §103(a) over GB 1 373 344 (hereinafter "GB") in view of FR 2 462 266 (hereinafter "FR"). The rejection is respectfully traversed.

Independent claim 17 recites, *inter alia*, depositing a cored reinforcement of substantially constant cross section in and along channels of a nodal mould and across nodes of the nodal mould by repeated passes along the channels to at least partially fill the channels, the reinforcement comprising an envelope of strength-giving fibers surrounding a core of material. Independent claim 17 further recites, *inter alia*, providing a reinforced nodal structure comprising a cellular structure formed from a network of walls formed by the strength-giving fibers

impregnated with resin. As acknowledged by the Examiner in the remarks regarding independent claim 17, GB neither discloses nor suggests such features.

As acknowledged by the Examiner, GB neither discloses nor suggests a cored reinforcement, let alone a cored reinforcement of substantially constant cross section deposited by repeated passes, as recited in independent claim 17. Thus, GB necessarily neither discloses nor suggests that the reinforcement comprises an envelope of strength giving fibers surrounding a core of material, as recited in independent claim 17, nor that such a deposit of material would result in a cellular structure formed by a network of walls, as recited in independent claim 17.

Further, FR fails to overcome the deficiencies of GB. That is, FR discloses the use of a single reinforcement of already expanded synthetic foam 2 surrounded by bundle braids 3 and 5 and glass threads 4. FR discloses the use of a single cored reinforcement that is specifically dimensioned to entirely fill a channel of a particular mould for a tennis racket (see page 3, lines 11-18 of FR) in a single pass. FR neither discloses nor suggests repeated passes along the channel to form a cellular structure formed from a network of walls formed by strength-giving fibers, as recited in independent claim 17. Thus, FR fails to overcome the deficiencies of GB.

Further, it would not have been obvious to one of ordinary skill in the art to combine the GB and FR references, as these references relate to two distinct types of reinforcing technology. More specifically, GB discloses a compression moulding apparatus, including a cavity defined by a base plate 11, pressure plate 12, and rubber blocks 13 and 14 shown in cross section in Figure

1 of GB. Carbon fibers impregnated with resin and hardener are laid in the uncovered cavity, and the pressure plate 12 is positioned atop the rubber blocks 13, 14. As loads A and B are applied, the inner faces 15 and 16 of the blocks 13, 14 to bulge toward the material. The pressure is maintained while the material is cured, resulting in a modified I-beam type shape with enhanced structural efficiency. This system is applied in the lattice structure mould shown in Figures 2-3 of GB, in which channels 24 formed in the mould are filled with pre-impregnated fibers, the channels 24 are closed off with pressure plates 26, and the mould is cured. In contrast, FR discloses that the mould is filled by a single cored reinforcement specifically designed to completely fill a particular mould. Thus, it would not have been obvious to combine these references to deposit multiple reinforcements of the type disclosed by FR in the structure disclosed by GB to arrive at a system as recited in independent claim 17. Rather, each of the GB and FR references teaches away from such a combination, as each is specifically designed to accommodate it own particular structural requirements.

For at least these reasons, it is respectfully submitted that independent claim 17 is allowable over the applied combination, and thus the rejection of independent claim 17 under 35 U.S.C. §103(a) over GB and FR should be withdrawn. Dependent claims 18-19 are allowable at least for the reasons set forth above with respect to independent claim 17, from which they depend, as well as for their added features.

The Office Action rejects claims 17-18, 32, and 41 under 35 U.S.C. §103(a) over U.S. Patent No. 6,245,274 to Huybrechts et al. (hereinafter "Huybrechts") in view of FR. Claim 41 is cancelled. The rejection, in so far as it applies to claims 17-18 and 32, is respectfully traversed.

Independent claim 17 recites, *inter alia*, depositing a cored reinforcement of substantially constant cross section in and along channels of a nodal mould and across nodes of the nodal mould by repeated passes along the channels to at least partially fill the channels, the reinforcement comprising an envelope of strength-giving fibers surrounding a core of material. Independent claim 17 further recites, *inter alia*, providing a reinforced nodal structure comprising a cellular structure formed from a network of walls formed by the strength-giving fibers impregnated with resin. As acknowledged by the Examiner in the remarks regarding independent claim 17, Huybrechts neither discloses nor suggests such features.

Rather, Huybrechts discloses a system for making grid stiffened structures, in which an expansion tool 14 is laid into grooves 12 formed in the base tool 10. Prepreg tows (not shown) are wound into a rib compaction area, and the tool 10 is covered and autoclaved. The elevated temperature of the autoclave causes the expansion tool 14, which has different thermal properties that that of the base tool 10, to expand, thus laterally compacting the tows wound in the tool. Huybrechts suffers deficiencies similar to GB, in that Huybrechts neither discloses nor suggests the use of a cored reinforcement, let alone a cored reinforcement of substantially

constant cross section deposited by repeated passes, as recited in independent claim 17. Thus, Huybrechts necessarily neither discloses nor suggests that the reinforcement comprises an envelope of strength-giving fibers surrounding a core of material, as recited in independent claim 17, nor that such a deposit of material would result in a cellular structure formed by a network of walls, as recited in independent claim 17.

Further, as set forth above, FR fails to overcome the deficiencies of Huybrechts. More specifically, FR neither discloses nor suggests a cellular structure, as recited in independent claim 17. Additionally, because Huybrechts is specifically directed at the lay in of multiple tows within the channels, there would have been no motivation to combine the Huybrechts and FR references as asserted in the Office Action.

For at least these reasons, it is respectfully submitted that independent claim 17 is allowable over the applied combination, and thus the rejection of independent claim 17 under 35 U.S.C. §103(a) over Huybrechts and FR should be withdrawn. Dependent claim 18 is allowable at least for the reasons set forth above with respect to independent claim 17, from which it depends, as well as for its added features.

Independent claim 32 recites, *inter alia*, depositing at least one length of an elongate cored reinforcement of substantially constant cross section into a mould, the reinforcement comprising an envelope of strength-giving fibers surrounding a core of expansible material, closing the mould, and reducing a pressure in the mould to cause expansion of the reinforcement and

reduce void space within and around the reinforcement. As set forth above, and as acknowledged by the Examiner in the remarks regarding independent claim 32, Huybrechts neither discloses nor suggests such features.

More specifically, Huybrechts neither discloses nor suggests the use of a cored reinforcement, let alone that the core is made of an expansible material. Further, Huybrechts merely discloses that the combined tool 22 is "bagged and autoclaved," but not that any type of vacuum or reduced pressure is applied to the combined tool 22. Rather, it would be well known to one of ordinary skill in the art that an autoclave would generate elevated pressures and temperatures, causing the expansion tool 14 to expand due to its coefficient of thermal expansion relative to the base tool 10, and to compress, or compact, the tows wound in the rib compaction area. Applicant respectfully submits Huybrechts teaches away from reducing a pressure in the mould, and thus neither discloses nor suggests such features.

Further, as set forth above, FR fails to overcome the deficiencies of Huybrechts. That is, FR discloses the use of an already expanded foam core, but not the use of a core that is capable of further expansion after lay-in, as would be an expansible core (see also page 4, line 25 of FR). Any expansion of the foam core is completed prior to laying it into the channels, and FR neither discloses nor suggests any expansion after the material is laid in, let alone any expansion caused by a reduced pressure.

Accordingly, it is respectfully submitted that independent claim 32 is allowable over the applied combination, and thus the rejection of independent claim 32 under 35 U.S.C. §103(a) over Huybrechts and FR should be withdrawn.

The Office Action rejects claims 20-22 under 35 U.S.C. §103(a) over GB and FR, and further in view of Koury, and also over Huybrechts and FR, and further in view of Koury. These rejections are respectfully traversed.

Dependent claims 20-22 are allowable over both the GB/FR and Huybrechts/FR combinations at least for the reasons set forth above with respect to independent claim 17, from which they depend, as well as for their added features. Further, Koury is merely cited to teach the use of a fiber placement head, and thus fails to overcome the deficiencies of the above stated combinations. Accordingly, it is respectfully submitted that claims 20-22 are allowable over the applied combinations, and thus the rejections should be withdrawn.

The Office Action rejects claim 23 under 35 U.S.C. §103(a) over GB and FR, and further in view of Mayes, and also over Huybrechts and FR, and further in view of Mayes. These rejections are respectfully traversed.

Dependent claim 23 is allowable over both the GB/FR and Huybrechts/FR combinations at least for the reasons set forth above with respect to independent claim 17, from which it depends, as well as for its added features. Further, Mayes is merely cited to teach the use of an insert, and thus fails to overcome the deficiencies of the above stated combinations.

Accordingly, it is respectfully submitted that claim 23 is allowable over the applied combinations, and thus the rejections should be withdrawn.

The Office Action rejects claim 22 under 35 U.S.C. §103(a) over GB and FR, and further in view of White, and also over Huybrechts and FR, and further in view of White. These rejections are respectfully traversed.

Dependent claim 22 is allowable over both the GB/FR and Huybrechts/FR combinations at least for the reasons set forth above with respect to independent claim 17, from which it depends, as well as for its added features. Further, White is merely cited to teach partially curing and molding a tackified fiber, and thus fails to overcome the deficiencies of the above stated combinations. Accordingly, it is respectfully submitted that claim 22 is allowable over the applied combinations, and thus the rejections should be withdrawn.

The Office Action rejects claims 17-18 and 20-22 under 35 U.S.C. §103(a) over U.S. Patent No. 6,050,315 to Deckers et al. (hereinafter "Deckers") in view of FR. The rejection is respectfully traversed.

Independent claim 17 recites, *inter alia*, depositing a cored reinforcement of substantially constant cross section in and along channels of a nodal mould and across nodes of the nodal mould by repeated passes along the channels to at least partially fill the channels, the reinforcement comprising an envelope of strength-giving fibers surrounding a core of material. Independent claim 17 further recites, *inter alia*, providing a reinforced nodal structure comprising

a cellular structure formed from a network of walls formed by the strength-giving fibers impregnated with resin. As acknowledged by the Examiner in the remarks regarding independent claim 17, Deckers neither discloses nor suggests such features.

More specifically, Deckers neither discloses nor suggests a cored reinforcement, let alone a cored reinforcement of substantially constant cross section deposited by repeated passes, as recited in independent claim 17. Thus, Deckers necessarily neither discloses nor suggests that the reinforcement comprises an envelope of strength giving fibers surrounding a core of material, as recited in independent claim 17, nor that such a deposit of material would result in a cellular structure formed by a network of walls, as recited in independent claim 17. Further, as set forth above, FR fails to overcome the deficiencies of Deckers.

More specifically, as previously set forth, FR discloses the use of a single reinforcement that is specifically dimensioned to entirely fill a channel of a particular mould. FR neither discloses nor suggests repeated passes along the channel to form a cellular structure formed from a network of walls formed by strength-giving fibers, as recited in independent claim 17. Further, as set forth above, it would not have been obvious to one of ordinary skill in the art to combine the Deckers and FR references, as these references relate to two distinct types of reinforcing technology. Rather, as set forth above, each of the Deckers and FR references teaches away from such a combination, as each is specifically designed to accommodate it own particular structural requirements. Thus, FR fails to overcome the deficiencies of Deckers.

For at least these reasons, it is respectfully submitted that independent claim 17 is allowable over the applied combination, and thus the rejection of independent claim 17 under 35 U.S.C. §103(a) over Deckers and FR should be withdrawn. Dependent claims 18 and 20-22 are allowable at least for the reasons set forth above with respect to independent claim 17, from which they depend, as well as for their added features.

The Office Action rejects claims 33-40 under 35 U.S.C. §103(a) over Huybrechts and FR, and further in view of U.S. Patent No. 4,012,549 to Slysh. The rejection is respectfully traversed.

Dependent claims 33-36 are allowable over Huybrechts and FR at least for the reasons set forth above with respect to independent claims 17 and 32, from which they respectively depend, as well as for their added features. Further, Slysh is merely cited to teach fabric strip inserts, and thus fails to overcome the deficiencies of Huybrechts and FR. Accordingly, it is respectfully submitted that claims 33-36 are allowable over the applied combination, and thus the rejection of claims 33-36 under 35 U.S.C. §103(a) over Huybrechts, FR, and Slysh should be withdrawn.

Independent claim 37 recites, *inter alia*, depositing a cored reinforcement of substantially constant cross section in and along channels of anodal mould and across the nodes formed in the nodal mould by repeated passes along the channel to at least partially fill the channel, and incorporating at least one insert along the channels, wherein the at least one insert extends in a longitudinal direction along at least one cored reinforcement. As set forth above and as

acknowledged by the Examiner in the remarks regarding independent claim 37, Huybrechts neither discloses nor suggests such features, and FR fails to overcome the deficiencies of Huybrechts. Further, as set forth above, there would have been no motivation to combine the Huybrechts and FR references. Still further, Slysh fails to overcome the deficiencies of Huybrechts and FR.

More specifically, Slysh discloses an isogrid structure made specifically of metal beams (see column 3, lines 10-13 and examples disclosed in Slysh). Slysh clearly discloses that, while composites materials that include fibers and resins have exceptional strength and stiffness, such composite materials are difficult and expensive to fabricate, and that an object of Slysh's invention is to provide a structure with a high strength to weight ratio which does not rely on the use of composites (see column 1, lines 34-55 of Slysh). Slysh discloses the use of composite inserts within a metal framework to achieve this objective, and clearly teaches away from using the disclosed inserts with a composite frame. Thus, it clearly would not have been obvious to combine the teachings of Slysh with those of Huybrechts and FR, either alone or in combination, to arrive at the method as recited in independent claim 37.

As previously set forth, the Huybrechts and FR references relate to two distinct types of reinforcing technology, and thus would not logically be combined. Rather, due to the specific structural characteristics associated with each reference, each reference clearly teaches away from the features discloses by the other. Further, as set forth above, Slysh clearly teaches away from

the use of fabric inserts in a composite structure, and thus would not logically be combined with the Huybrechts and FR references, either alone or in combination. Thus, it is respectfully submitted that the Examiner's piecemeal reconstruction of the method as recited in independent claim 37 by the combination of the Huybrechts, FR, and Slysh references indicates that the combination requires the use of impermissible hindsight gleaned from Applicants' own disclosure.

For at least these reasons, it is respectfully submitted that independent claim 37 is allowable over the applied combination, and thus the rejection of independent claim 37 under 35 U.S.C. §013(a) over Huybrechts, FR, and Slysh should be withdrawn. Dependent claims 38-40 are allowable at least for the reasons set forth above with respect to independent claim 37, form which they depend, as well as for their added features.

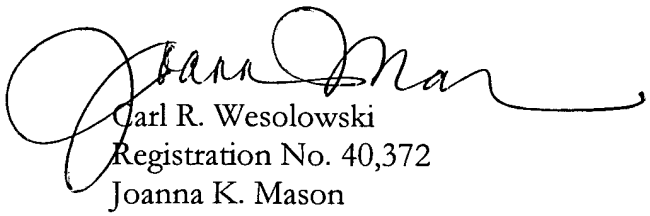
IV. Conclusion

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. If the Examiner believes that any additional changes would place the application in better condition for allowance, the Examiner is invited to contact the undersigned, **JOANNA K. MASON**, at the telephone number listed below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this,

concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
FLESHNER & KIM, LLP



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